

look for



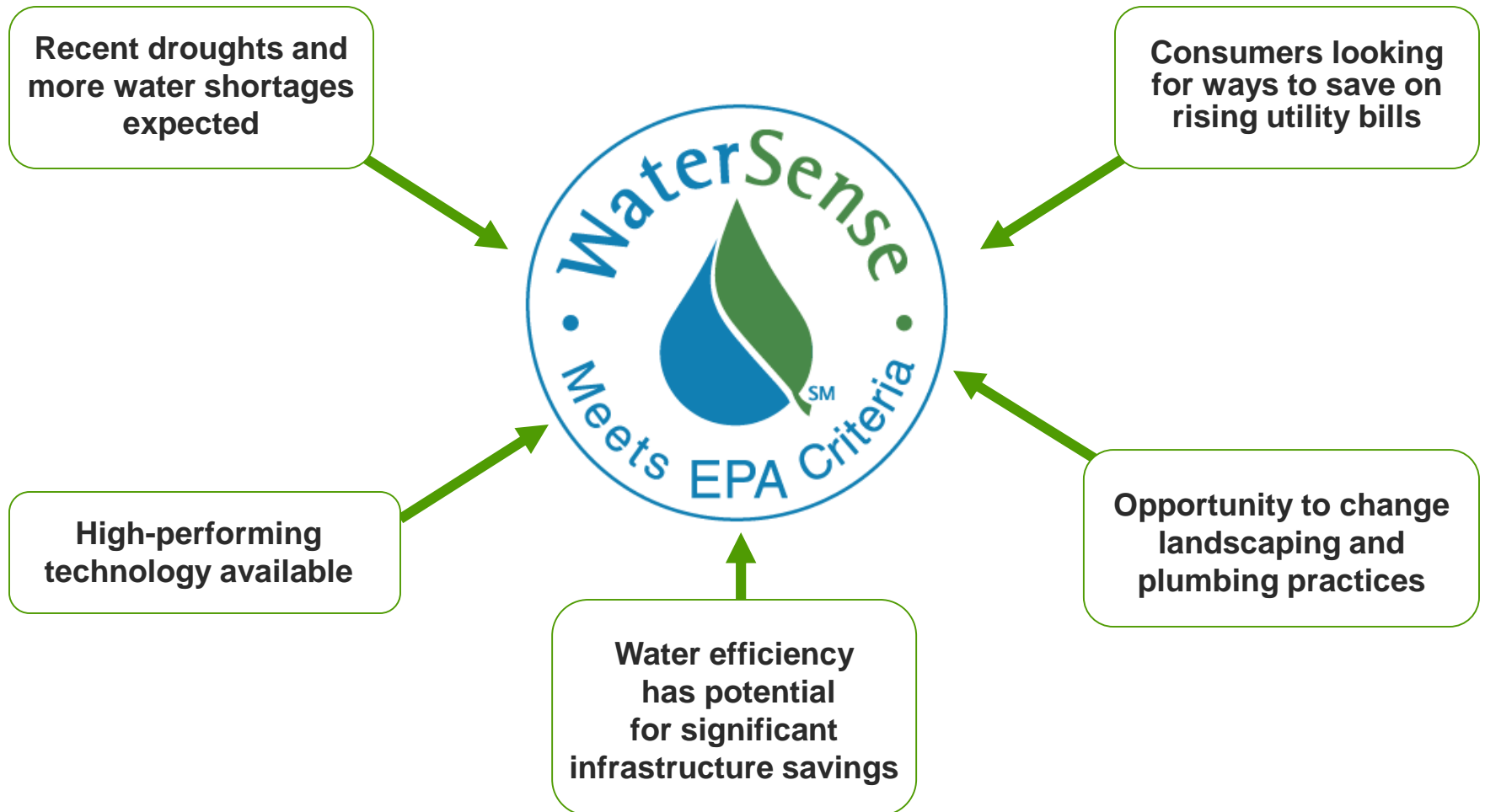
# Saving Water with WaterSense

**Cary McElhinney**

**U.S. EPA**

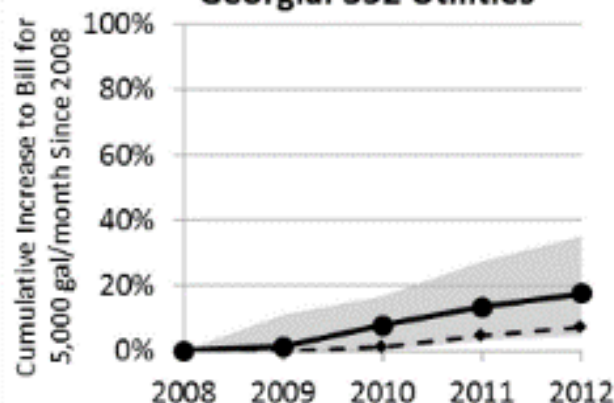
May 19, 2016

# Why Water Efficiency?

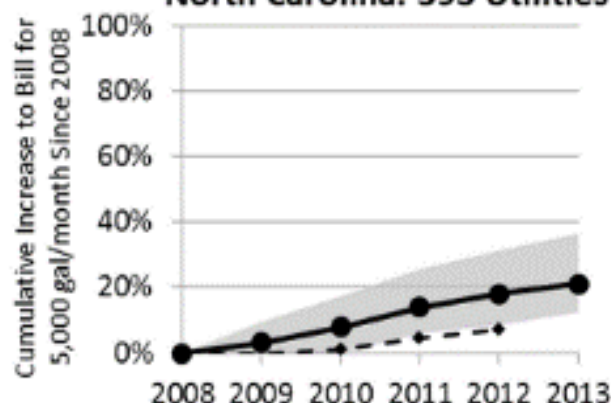


# Cumulative Bill Increases for Water or Combined Water and Wastewater in 1,961 Utilities in Six States Compared to CPI by Region

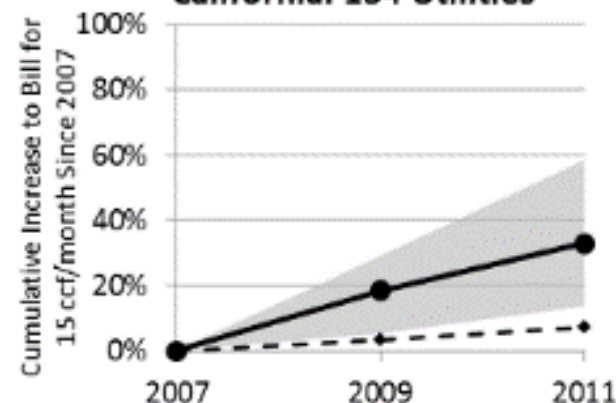
**Georgia: 352 Utilities**



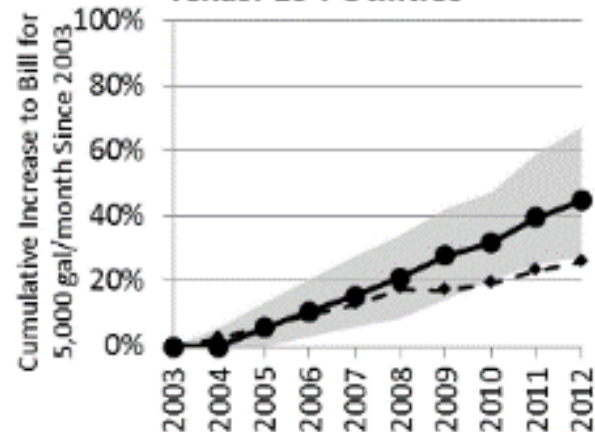
**North Carolina: 393 Utilities**



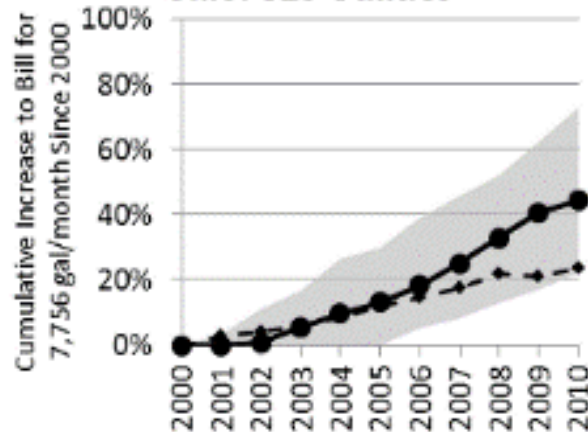
**California: 134 Utilities**



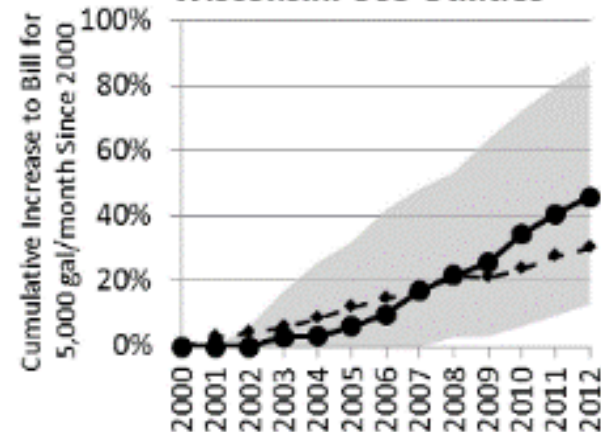
**Texas: 194 Utilities**



**Ohio: 325 Utilities**



**Wisconsin: 563 Utilities**



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Rates data for all utilities in this analysis were known for all consecutive years and the cohort of utilities is the same for all years. Inflation of the regional Consumer Price Index is shown for the region each state is located in: South for GA, NC, TX; West for CA; Midwest for OH, WI. Data sources: Annual and biennial statewide rates surveys conducted by Raftelis Financial Consultants (CA), Georgia Environmental Finance Authority/Environmental Finance Center, North Carolina League of Municipalities/Environmental Finance Center, Ohio EPA, Texas Municipal League, and Wisconsin Public Service Commission; Regional Consumer Price Indices by the U.S. Bureau of Labor Statistics.

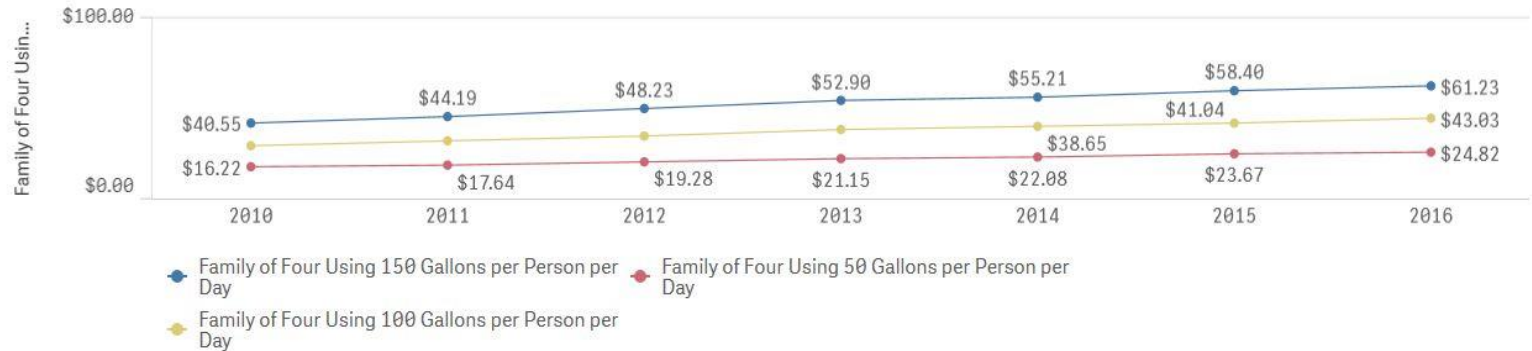
- Interquartile range (middle 50% of utilities)
- Median
- Cumulative regional CPI inflation since reference year

# Water Rates Dashboard

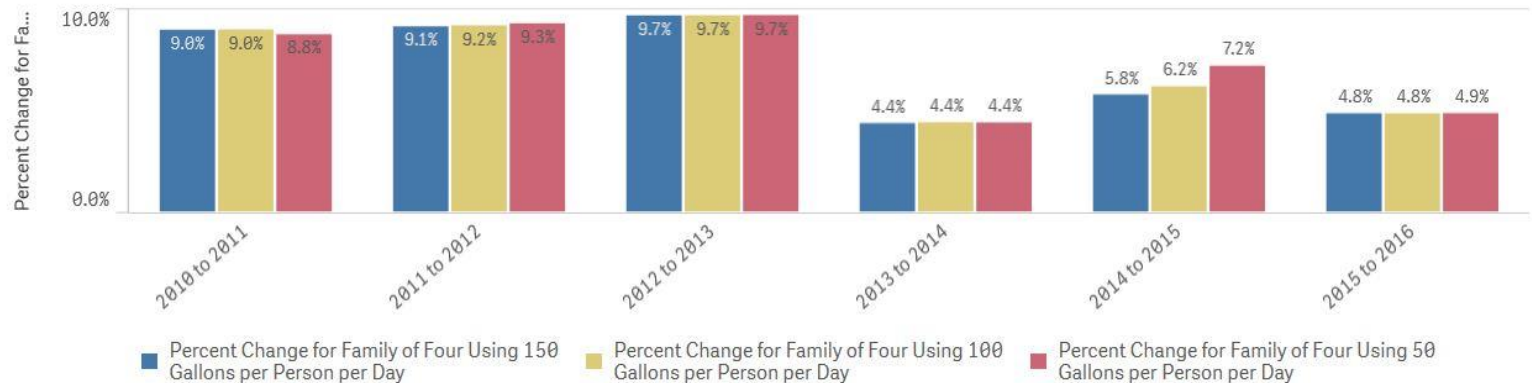
This interactive graphic shows seven years of water rates data from 30 major U.S. cities. The graphs above show average monthly residential water prices for three levels of consumption (top) and the annual percent change (bottom). Use the buttons on the left side to show the same data for a single year or city.

CLEAR ALL

Average Monthly Water Bill



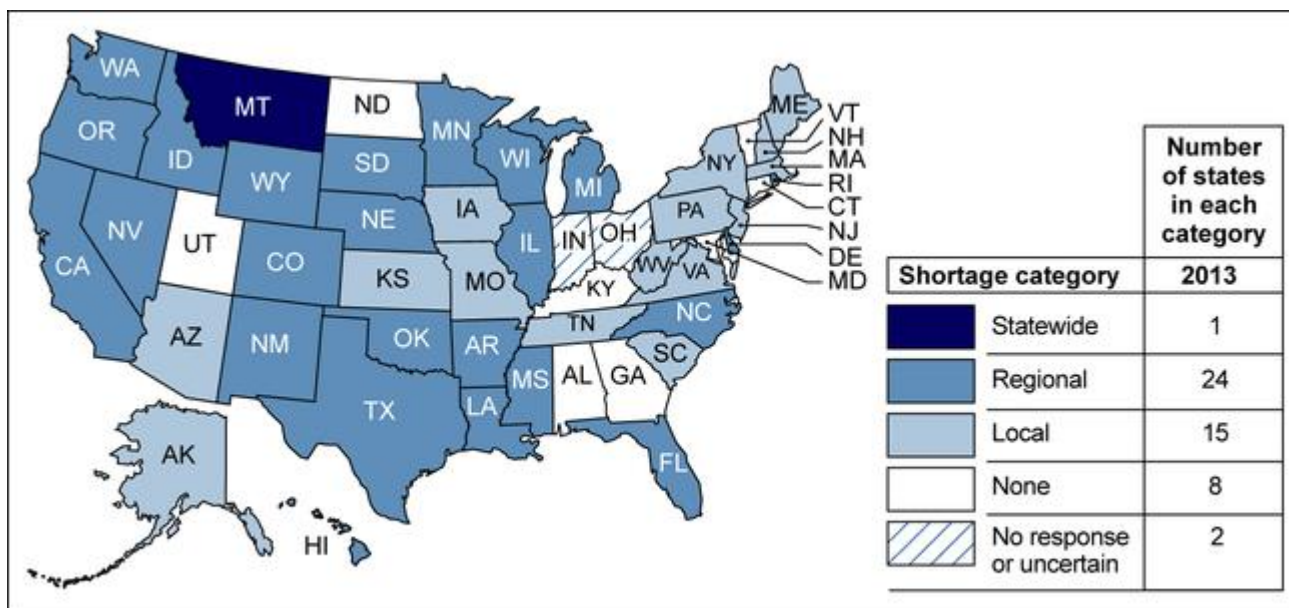
Annual Percent Change for Average Monthly Water Bill



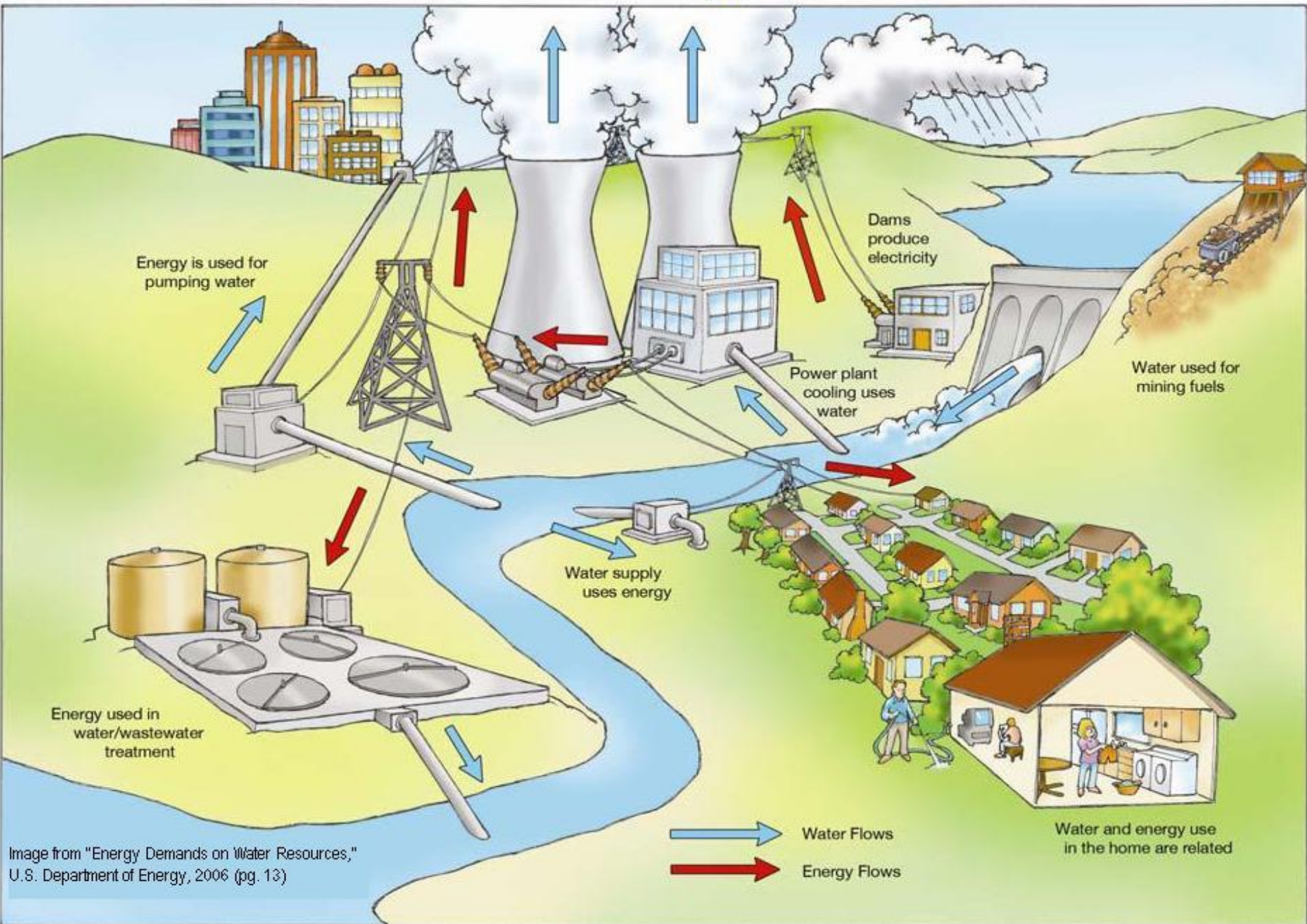


# GAO Report - 2014

“According to state water managers, experts, and literature GAO reviewed, freshwater shortages are expected to continue into the future. In particular, 40 of 50 state water managers expected shortages in some portion of their states under average conditions in the next 10 years (see fig.). However, uncertainty stemming from factors, such as patterns of economic growth and land use change, is likely to complicate future state water managers' planning efforts.”



# The Water-Energy Nexus



# Why Save Water?

## Reduce risk by reducing uncertainty

- Water and sewer rates increasing rapidly; faster than inflation
- Variations in rates make future costs unpredictable
- Water shortages and droughts can cause problems with availability

## Save operational costs to maximize profit margins

- Saving water saves energy, maximizing savings and efficiency
- Offset increased costs from expansions or changes in facility usage/occupancy rates

## Compete in the green building/business marketplace

- Customers expect sustainability ethic
- Achieve green labels/recognition (LEED, etc.)





# WaterSense Can Help



WaterSense is a voluntary program launched by EPA in 2006 that provides a simple way to identify water-efficient:

- Products
- Homes
- Programs
- Practices

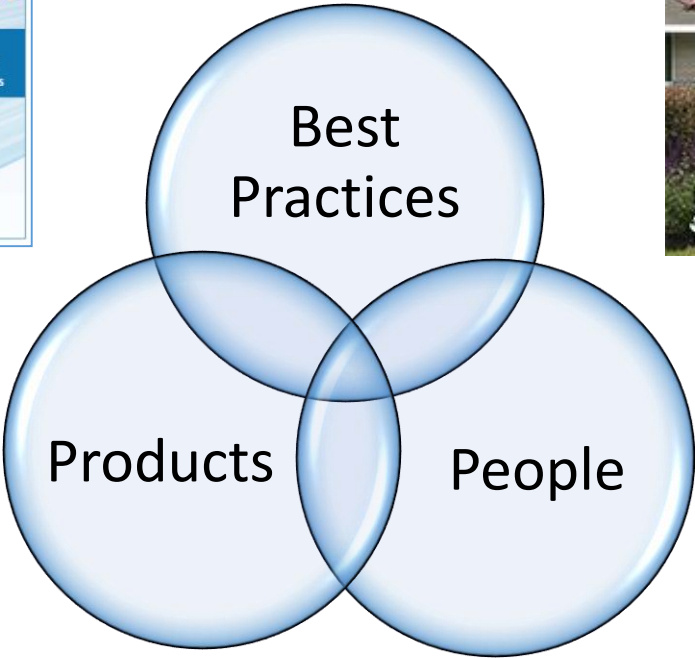
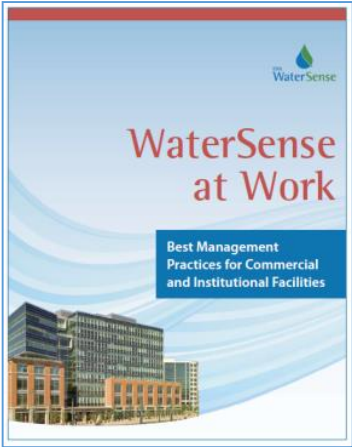
Products are independently certified for water efficiency **and** performance







# WaterSense Resources





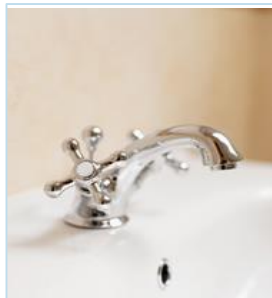
look for



# Look for the WaterSense Label



**Flushing  
Urinals**



**Lavatory  
Faucets**



**Irrigation  
Controllers**

**More than 16,000  
product models have  
earned the label**



**New! Flushometer-Valve  
Toilets**



**Tank-Type  
Toilets**



**Showerheads**



**Pre-Rinse  
Spray Valves**



Water factors are also  
included in many  
ENERGY STAR qualified  
products

[Share](#)[Become a fan](#)

## Product Search

Reduce your water use while enjoying exceptional performance with the following WaterSense labeled products. Search by category, brand, model name, and/or model number, search results appear below.

Please review [important product information](#) before purchasing WaterSense labeled products.

Product Category

Showerheads



Brand Name

All Brands

Alsons

Brizo

Cleveland Faucet Group (a Moen brand)

Delta



Model Name

Classic



Model Number

Number of Products found: 1

Filtered By: Showerheads, Delta

**Double-click on a row to view detailed product information.**

[Print](#)[Download](#)

Brand Name	Model Name	Model Number
Delta	Classic	1323*

« » | Page  of 1 | » »

**Please note:** WaterSense retailer partners commit to making WaterSense labeled products available in stores. However, products may not be available in all markets.

**Disclaimer of Endorsement:** Reference herein to any specific commercial products, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government.





# Free WaterSense Resources

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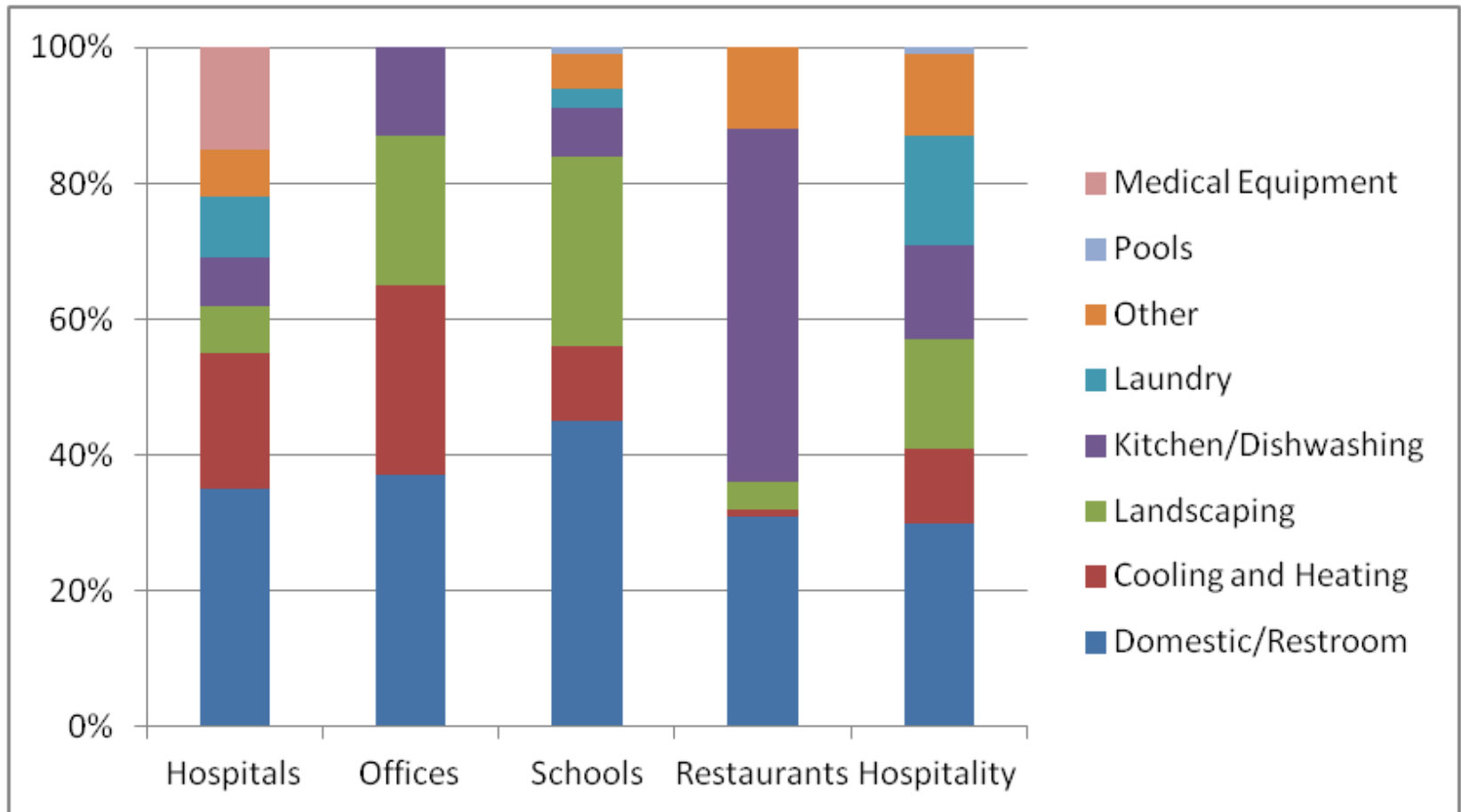
- Water use information by facility type
- Water-saving tips
- Best Management Practices
- Assessment tools
- Worksheets and checklists
- Live and recorded training webinars
- Case studies and more!



[www.epa.gov/watersense/commercial/tools.html](http://www.epa.gov/watersense/commercial/tools.html)



# Water Use Profiles of Commercial Facilities



Created by analyzing data from: New Mexico Office of the State Engineer, American Water Works Association (AWWA), AWWA Research Foundation, and East Bay Municipal Utility District

Water Efficiency

# Best Management Practices

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*WaterSense at Work* is an online guide facilities can use to manage water use:

Water management planning

Water use monitoring and education

Sanitary fixtures and equipment

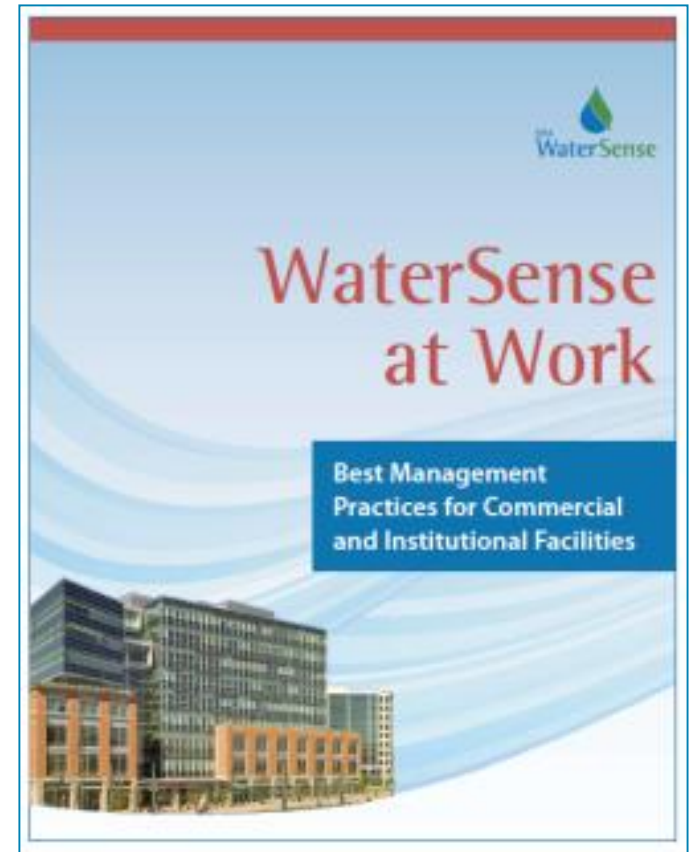
Commercial kitchen equipment

Outdoor water use

Mechanical systems

Laboratory and medical equipment

Onsite alternative sources of water







# Make Changes with *WaterSense at Work*



## 36 best management practices

- Overview of technology
- O&M and user education tips
- Retrofit and replacement options
- Calculations for potential water energy and dollar savings and payback

15+ case studies from all types of facilities using BMPs



### 6.3 Cooling Towers

#### Overview

Cooling towers are used in a variety of commercial and institutional applications to remove excess heat. They serve facilities of all sizes, such as office buildings, schools, supermarkets, and large facilities, such as hospitals, office complexes, and university campuses. Cooling towers dissipate heat from recirculating water that is used to cool chillers, air conditioning equipment, or other process equipment. By design, they use significant amounts of water.

Cooling towers often represent the largest use of water in industrial and commercial applications, comprising 20 to 50 percent or more of a facility's total water use. However, facilities can save significant amounts of water by optimizing the operation and maintenance of cooling tower systems.<sup>1</sup>



Cooling towers work by circulating a stream of water through systems that generate heat as they function. To cool the system, heat is transferred from the system to the water stream. This warm water is then pumped to the top of the cooling tower, where it is sprayed or dripped through internal fill (i.e., a labyrinth-like packing with a large surface area). Fans pull or push air through the tower in a counterflow, crossflow, or parallel flow to the falling water. As some of the water is evaporated, the heat is removed.<sup>2</sup> The remaining cooled water is recirculated back through the systems to repeat the process.

The thermal efficiency and longevity of the cooling tower and its associated water loops depend upon the proper management of water recirculated through the tower. Water leaves a cooling tower system in four ways: evaporation, blowdown or bleed-off, drift, and leaks or overflows.

#### Evaporation

Evaporation is the primary function of the tower and is the method that transfers heat from the cooling tower system to the environment. The quantity of evaporation is not typically targeted for water-efficiency efforts, because it controls the cooling process (although improving the energy efficiency of the systems that use the cooling water will reduce the evaporative load on the tower). The rate of evaporation from a cooling tower is typically equal to approximately 1 percent of the rate of

<sup>1</sup> North Carolina Department of Environment and Natural Resources, et al. May 2009. *Water Efficiency Manual for Commercial, Industrial and Institutional Facilities*. Page 39. [www.waternc.org/bushhome.php](http://www.waternc.org/bushhome.php).  
<sup>2</sup> Ecol.

6-8 *WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities*

# Main Message: Water Management and Planning



- Measure water use with properly installed meters and sub-meters
- Set efficiency goals
- Conduct a facility water audit
- Track usage in Portfolio Manager
- Incorporate water efficiency into procurement language and policies





# Water Assessment Worksheets



Writeable PDF can be used on tablet or printed

Guides through each part of facility assessment

Each is a tab in WaterUSE Tool

Metering data can be uploaded into Portfolio Manager for tracking use over time

- 1: Facility Information
- 2: Metering
- 3: Guest Rooms
- 4: Public Restrooms
- 5: Guest Ice and Laundry
- 6: Linen Laundry
- 7: Commercial Kitchens
- 8: Dishwashing
- 9: HVAC and Mechanical Systems
- 10: Outdoor Water and Irrigation
- 11: Pools and Spas





# The WaterUSE Tool

Uses facility-specific information from water assessment to:

Identify water-saving changes

- Estimated water use from each end use area
- Potential retrofit or replacement projects for water-efficient fixtures/equipment
- Specific BMPs to reduce water and energy use

Calculate potential savings using customizable project costs in excel-based tool

- Estimated water, energy, and cost savings from the changes
- Estimated project payback period



look for



# Water Saving Tips: Fix Leaks!

Leaks can be the greatest source of water waste within a facility

Leaking or continuously running water provides no added value

Facilities pay for water twice -  
water supplied and water discharged

Unlike energy products, plumbing  
products leak when they fail

Place signage in restrooms so  
employees, visitors, and guests  
can help find and report leaks



## REPORT WATER LEAKS

One leaky faucet can waste  
the equivalent of 7,881 one  
liter bottles per year!

Call for free repairs:

Medical Center	Campus
(415) 353-1120	(415) 476-2021

LivingGreen  
at UCSF

# Water Savings in Restrooms

Restrooms can account for up to 40% of water use

Older fixtures installed before 1994 use 3-5 times more water than newer efficient models

Water savings depend on user behavior just like energy

Educate users on proper use to achieve greatest savings

- Signage at point-of-use can prompt correct use
- Include instructions with dual-flush fixtures and other newer technologies
- Add maintenance contact info for users to report problems





# Water Use in Commercial Kitchens



- Up to 15% of water can be used in commercial kitchens in cafeterias, restaurants, or other tenant or retail spaces
- Stop continuous operation and water flow in food disposal systems (2 to 15 gal per min) or avoid using water by scraping food off dishes for composting
- Monitor steam cooker and steam kettle systems to repair leaks and reuse condensate water
- Right-size replacement equipment and purchase ENERGY STAR certified models to maximize water, energy, and cost savings
- ★ Some ENERGY STAR product categories can be 20-90% more water-efficient
- Install WaterSense labeled pre-rinse spray valves to clean dishes efficiently and save hot water and energy



**[ENERGY STAR Commercial Kitchen Equipment Calculator](#)**

# Mechanical Systems

Mechanical systems can account for up to 30% of water use

Eliminate single-pass cooling systems – use 40x more water than cooling towers

Regularly check for systems for leaks

Manage heating, cooling, and steam systems efficiently to save water and energy

- Maximize cooling tower cycles of concentration
- Sub-meter cooling tower make-up water to measure evaporation losses





# Outdoor Water Waste

20-30% of a building's water can be used outdoors

Losses caused by:

- Poor irrigation system design
- Improper system installation and management
- Lack of maintenance
- Improper scheduling

Get help from an irrigation pro certified by a WaterSense labeled program





# Quick Wins

Check out our free Tools and Trainings:

<http://www.epa.gov/watersense/commercial/tools.html>

Start your facility water assessment by collecting your water bills and conducting your water use inventory

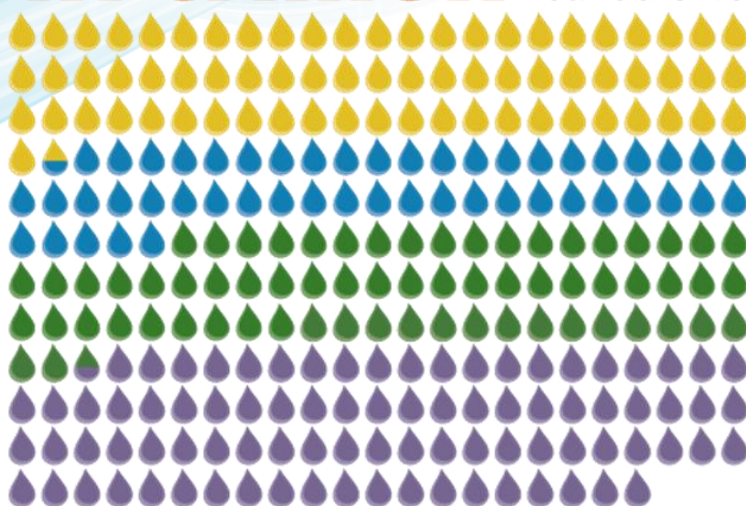
Educate employees and guests to look for and report leaks so they can be fixed immediately

Remember savings aren't limited to major renovations or equipment retrofits; changes to O&M standard operating procedures and usage patterns can make a big difference





**1.1 trillion** gallons of water saved since 2006!



2007 - 2011  
2012  
2013  
2014

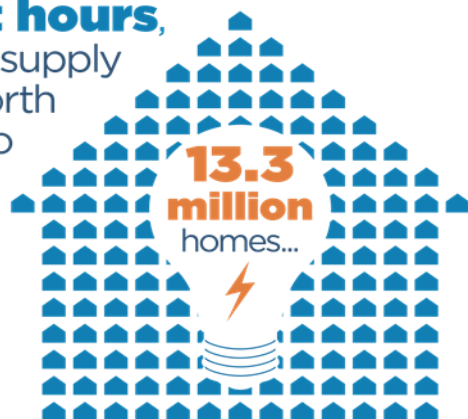


That's **more than** the amount of water used by all of the households in **Texas** for a year!

**WaterSense** has helped **reduce** the amount of **energy needed** to heat, pump, and treat water by

**146 billion** kilowatt hours,

enough to supply a year's worth of power to more than



...eliminating  
**54 million** metric tons of greenhouse gas emissions...



...the equivalent of planting nearly **1.4 billion** trees...



...and **saving consumers** **\$21.7 billion** in water and energy bills



# More Information

- WaterSense Information
  - Web site: [www.epa.gov/watersense](http://www.epa.gov/watersense)
    - List of products
    - Partnership information
    - Educational fact sheets and resources
  - E-mail: [watersense@epa.gov](mailto:watersense@epa.gov)
  - [www.facebook.com/epawatersense](https://www.facebook.com/epawatersense)
  - [www.twitter.com/epawatersense](https://www.twitter.com/epawatersense)
  - Toll-free Helpline: (866) WTR-SENS
  - Cary McElhinney – EPA Region 5
  - E-mail: [mcelhinney.cary@epa.gov](mailto:mcelhinney.cary@epa.gov)
  - Phone: (312) 886-4313

